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54 **Method and apparatus for suspending poultry with its legs from a suspension conveyor.**

57 In correspondence with the invention poultry to be suspended with its legs from a suspension conveyor (27) is firstly oriented in parallel with a certain direction, such as the conveying direction of the suspension conveyor, next possibly spaced at a certain mutual distance, thereafter oriented in the said direction with its belly and finally in this position

engaged at its legs and lifted by the suspension conveyor. The apparatus according to the invention comprises a conveyor supporting and supplying the poultry (1), means (8) or orienting the poultry in parallel with the conveying direction of the conveyor and means for orienting (17) the poultry with its belly in the conveying direction.

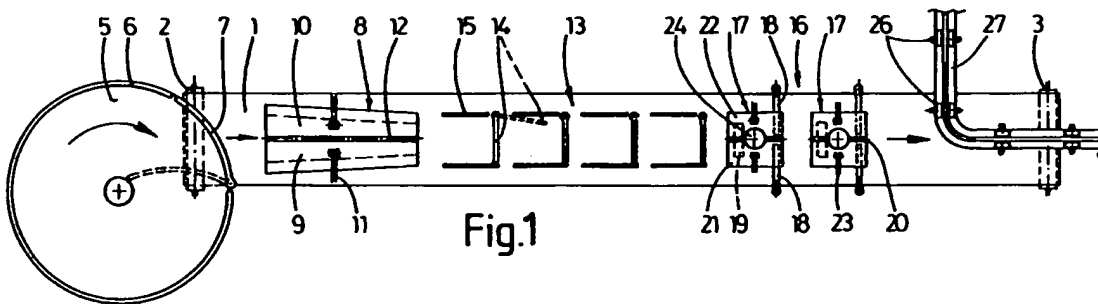


Fig.1

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The invention relates to a method for suspending poultry with its legs from a suspension conveyor. Further the invention relates to an apparatus for carrying out this method.

At a large number of processing methods for poultry it is common practice that the poultry is suspended with its legs from the hooks of a suspension conveyor. In such a suspending position the poultry is then supplied to several processing machines. Suspending poultry from the hooks from a suspension conveyor nowadays occurs mainly manually. This is a result of the fact that at the moment of suspending the poultry from the suspension conveyor it is still living and thus is offered to the suspension location in different, non-predictable positions.

It will be realised that manually suspending poultry with its legs from a suspension conveyor is labor-intensive. Further it is dull and stultifying labor. Moreover with the present processing velocities of processing machines for poultry the limitations of human capacities are reached, such that more than one operators are required for suspending the poultry from the suspension conveyor, this still further increasing the costs.

In the past several attempts have been made for automating the suspension of poultry from a suspension conveyor. However, in practice the presented measures appear to be not or hardly realisable or are that complicated that the application is not attractive.

It is an object of the invention to optimise a method for suspending poultry with its legs from a suspension conveyor in such a way that a basis is provided for its automation.

Thus the method according to the invention is characterized by the next steps:

- a) orienting the poultry in parallel with a certain direction, such as the conveying direction of the suspension conveyor;
- b) possibly spacing the poultry at a certain mutual distance;
- c) orienting the poultry with its belly in the said direction;
- d) engaging the legs of the poultry oriented such by means of the suspension conveyor and lifting the poultry.

As noted the supply of poultry occurs in an uncontrolled way as relating to its position. Thus the first step of the method is orienting the poultry in parallel with a certain direction, such as the conveying direction of the suspension conveyor. After this step the poultry is oriented in the said direction with its belly or its back. This means that each separate bird is positioned in one of two clearly defined positions.

Next the poultry, if necessary, is spaced at a certain mutual distance. As a result it is possible to

optimally conduct the next step. This next step comprises orienting the poultry with its belly in the said direction, which only occurs for those birds of which initially the back was oriented in the said direction after being oriented in parallel with the said direction.

When like this finally all birds are oriented in the same direction (that is with the belly in the said direction), the legs of the poultry are engaged by the suspension conveyor and the poultry is lifted.

Using the method according to the invention supplied birds, irrespective the position in which they are supplied, are identically offered to and suspended from the suspension conveyor. Thus this method is a basis for an automation of this process.

The apparatus for carrying out the method according to the invention is characterized by a conveyor supporting and supplying the poultry, means for orienting the poultry in parallel with the conveying direction of the conveyor and means for orienting the poultry with its belly in the conveying direction.

In this respect it is possible, that the apparatus further comprises means for, after orienting in the conveying direction, spacing the poultry at a certain mutual distance.

Using the apparatus according to the invention the method according to the invention can occur in a completely automated way, such that the previously mentioned manual realisation of the method and its copending disadvantages will not occur.

According to a preferred embodiment of the apparatus according to the invention the orienting means comprise two sheets defining a tunnel narrowing in the conveying direction, said sheets further being movable to and fro transversally to the conveying direction. When the sheets move towards each other transversally to the conveying direction they engage the poultry and make sure that it is oriented in the conveying direction with its back or its belly. Initially the engagement with the poultry occurs moderately at the most wide section of the tunnel, and it increases while the poultry is moved by the conveyor in the direction of the narrower section of the tunnel. Further these orienting means have the effect that all birds are located at the same lateral position of the conveyor, which simplifies later processing steps.

Further it is possible, that the means for orienting poultry with its belly in the conveying direction comprise means registering the position of the poultry and means for rotating over 180° the poultry initially oriented in the conveying direction with its back. When the registration means determine that a bird is oriented in the conveying direction with its back the rotating means are activated, such that the respective bird is rotated over 180° until it

is oriented in the conveying direction with its belly.

Constructively an embodiment is conceivable, in which the registration means comprise a stopper temporarily engaging the poultry at the height of the knee joint and a weight-sensitive means positioned below the conveyor and behind the stopper position as seen in the conveying direction. The knee joint of a bird oriented in the conveying direction with its back is oriented in the conveying direction too. At the moment where the knee joint engages a stopper the legs of the bird are positioned at the weight-sensitive means which reacts to the weight of the bird. This leads to the activation of the rotating means.

If however the bird is already oriented in the conveying direction with its belly the forward side of the knee joint (in fact the back of the knee) will engage the stopper. At this very moment the legs of the respective bird have already passed the weight-sensitive means, which then will not be activated. This means too that no activation of the rotating means will occur.

In a special embodiment of the apparatus according to the invention the rotation means comprise two cooperating plates which can pivot around a horizontal axis and which in a first position give free the poultry and in a second position sideways enclose the poultry while letting free a lower passage for the legs of the poultry, said plates being commonly suspended from and rotatable around a vertical axis.

Hereinafter the invention will be elucidated by means of the drawing, in which an embodiment of the apparatus according to the invention is illustrated.

Fig. 1 shows an embodiment of the apparatus according to the invention in a schematical top plan view;

fig. 2 shows the apparatus of fig. 1 in a side elevational view;

fig. 3 shows, on a larger scale, a section according to III-III in fig. 2;

fig. 4 shows, on a larger scale, a section according to IV-IV in fig. 2, and

fig. 5 shows a view according to arrow V in fig. 4.

The apparatus for suspending poultry with its legs from a suspension conveyor comprises a conveyor 1, which in the present case is an endless conveyor belt extending around rolls 2, 3 and being supported by auxiliary rolls 4. At the beginning of the conveyor 1 a turn table 5 is located with a surrounding wall 6 and controllable access port 7. The poultry is positioned onto the turn table 5 and can reach the conveyor 1 when the access port is in its position referenced with 7'.

The birds conveyed by the conveyor 1 in the direction indicated by arrows firstly reach a station

8 for orienting the poultry in parallel with the conveying direction of the conveyor. In the illustrated embodiment this station comprises two sheets 9, 10 defining a tunnel narrowing in the conveying direction, said sheets being movable to and fro transversally to the conveying direction. For this reason the sheets 9, 10 are connected to cylinder-piston assemblies 11 (clearly visible in fig. 3). The sheets 9, 10 pivot around a pivot axis 12. As a result of the to and fro movement of the sheets 9, 10 around the pivot axis 12 and the narrowing shape of the tunnel defined by the sheets 9, 10 in the conveying direction of the conveyor 1 the poultry is slowly but definitely oriented in parallel with the conveying direction of the conveyor. This means that each bird after leaving the sheets 9, 10 is oriented in the conveying direction with its belly or its back.

Next the birds reach a buffer device 13. This comprises a number of cages 15 located at mutual distances and with operatable ports 14. In each cage 15 a bird is supplied by the conveyor 1 from the open backside wherein the bird can only leave the cage 15 if the port 14 is opened. By an appropriate control of the ports 14 the birds can be spaced at desired mutual distances, while care can be taken that the separate birds are supplied to the next station 16 one by one in a controlled way.

At the station 16 the birds, which at this moment are oriented in the conveying direction of the conveyor 1 with their backs, are rotated over 180°, such that they are oriented in the conveying direction with their bellies. In the illustrated embodiment station 16 comprises two identical units 17. Basically also one unit 17 could take care of rotating the birds, but the double provision has as an advantage that the chance of wrongfully not rotating a bird is minimised.

Each unit 17 comprises registration means which register whether a bird is oriented in the conveying direction with its back or with its belly. These registration means firstly comprise a stopper temporarily engaging the poultry at the knee joint, said stopper in the illustrated embodiment existing of two rods 18 which, for enabling the poultry to pass, may pivot in the conveying direction. Further the registration means comprise a weight-sensitive means 19 positioned below the conveyor 1 and behind the stopper position as seen in the conveying direction. A bird oriented in the conveying direction with its back has its knees facing in the conveying direction, such that when these knees engage the rods 18 the legs of the bird are positioned above the weight-sensitive means 19. Then the weight-sensitive means 19 generates a signal for activating the unit 17 for rotating the bird. If a bird is oriented in the conveying direction with its belly the legs of the bird will, when the back of the

knees engages the rods 18, already have passed the weight-sensitive means 19, such that no activation of the unit 17 occurs. The unit 17 (also represented in fig. 4) exists of two cooperating plates 21 and 22 which can pivot around a horizontal axis 20. The pivoting of the plates 21, 22 may again occur by cylinder-piston assemblies 23. The entire assembly of plates 21, 22 and cylinder-piston assemblies 23 may be rotated around a vertical axis by a motor 24.

In a first position, which has been represented in fig. 4 by dotted lines, the plates 21, 22 give free a bird. In a second position, represented in fig. 4 by full lines, the plates 21, 22 sideways enclose the bird while however letting free a lower passage 25 for the legs of the poultry (clearly visible in fig. 5).

When using the registration means 18 and 19 it has been determined that a bird is oriented in the conveying direction of the conveyor 1 with its back and has to be rotated, the plates 21, 22 initially positioned in the first, opened position are moved towards the closed position by the cylinder-piston assemblies 23, thus enclosing the bird. Next the motor 24 is activated and the plates 21, 22 are rotated over 180° around a vertical axis. Next the plates 21, 22 are again separated and the bird is freed.

It is possible, that the rods 18 are lifted over a short distance previously to closing the plates 21, 22, such that the plates 21, 22 correctly engage the breast of the bird.

Next the bird, which is now in the desired position on the conveyor 1, will be engaged at its legs in a way known per se by a hook 26 of a suspension conveyor 27 and will, after leaving the conveyor 1, be suspended with its legs from this hook upside down.

The entire apparatus is completely automated. The control of the stations and other devices may be carried out by a computersystem. The buffer device 13 takes care of having prepared birds at each moment to be offered to the rotation unit 16. Dependant upon the number of birds present in the buffer device 13 the access port 7 is opened or closed.

The invention is not limited to the embodiment described before, but may be varied widely within the scope of the invention.

Claims

1. Method for suspending poultry with its legs from a suspension conveyor characterized by the next steps:

- a) orienting the poultry in parallel with a certain direction, such as the conveying direction of the suspension conveyor;

- b) possibly spacing the poultry at a certain mutual distance;
- c) orienting the poultry with its belly in the said direction;
- d) engaging the legs of the poultry oriented such by means of the suspension conveyor and lifting the poultry.

2. Apparatus for carrying out the method according to claim 1, characterized by a conveyor supporting and supplying the poultry, means for orienting the poultry in parallel with the conveying direction of the conveyor and means for orienting the poultry with its belly in the conveying direction.

3. Apparatus according to claim 2, characterized by means for, after orienting in the conveying direction, spacing the poultry at a certain mutual distance.

4. Apparatus according to claim 2 or 3, characterized in that the orienting means comprise two sheets defining a tunnel narrowing in the conveying direction, said sheets further being movable to and fro transversally to the conveying direction.

5. Apparatus according to claim 2, 3 or 4, characterized in that the means for orienting poultry with its belly in the conveying direction comprise means registering the position of the poultry and means for rotating over 180° the poultry initially oriented in the conveying direction with its back.

6. Apparatus according to claim 5, characterized in that the registration means comprise a stopper temporarily engaging the poultry at the height of the knee joint and a weight-sensitive means positioned below the conveyor and behind the stopper position as seen in the conveying direction.

7. Apparatus according to claim 6, characterized in that the stopper comprises two rods which, for enabling the poultry to pass, may pivot in the conveying direction.

8. Apparatus according to one of the claims 5-7, characterized in that the rotation means comprise two cooperating plates which can pivot around a horizontal axis and which in a first position give free the poultry and in a second position sideways enclose the poultry while letting free a lower passage for the legs of the poultry, said plates being commonly suspended from and rotatable around a vertical axis.

9. Apparatus according to one of the claims 2-8, **characterized** in that the means for spacing the poultry at a certain mutual distance comprise a number of poultry ports positioned in succession in the conveying direction and being selectively activatable. 5
10. Apparatus according to one of the claims 2-9, **characterized** in that the conveyor is a belt conveyor. 10

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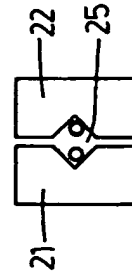
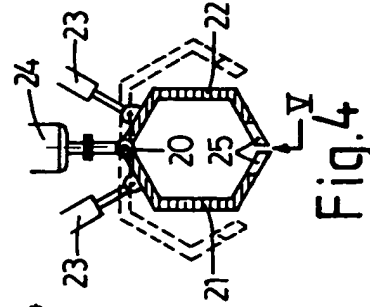
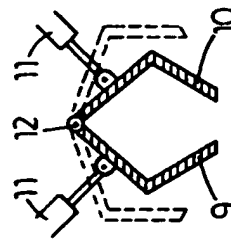
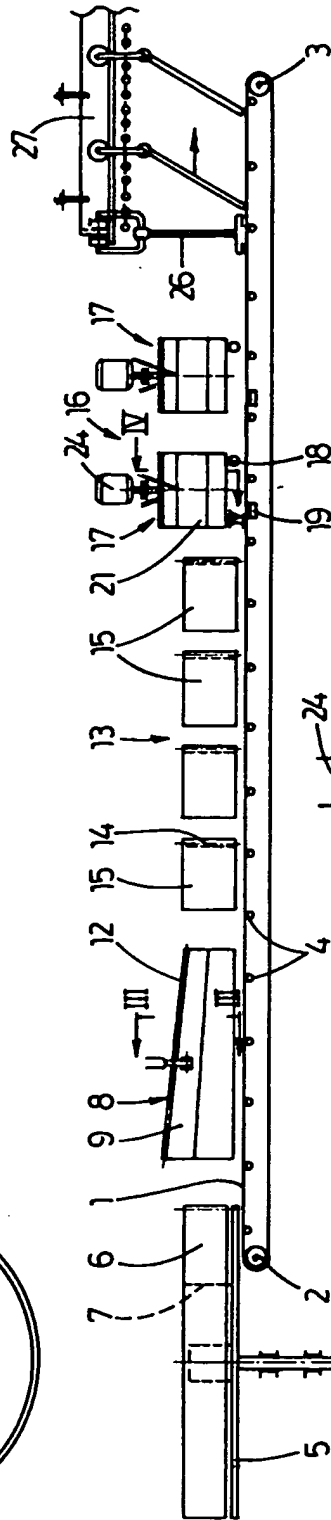
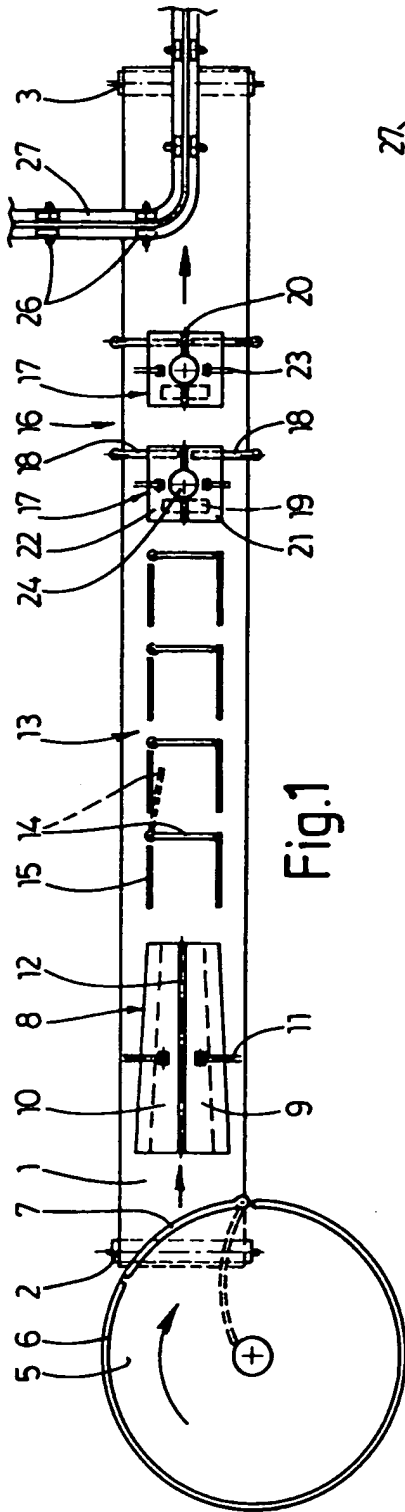
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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 2850

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 145 077 (VAN DEN BRINK) * page 8, line 5 - page 13, line 4 *	1,2,4,10	A01K45/00
A	US-A-4 307 683 (PARKER)		
A	US-A-4 272 863 (PARKER)		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A01K A22C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 26 OCTOBER 1992	Examiner DE LAMEILLIEURE D.
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X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : member of the same patent family, corresponding document	

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